Older adults' perceived sense of social exclusion from the digital world

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Abstract: A great deal of information and many services can now be accessed digitally. In order to make use of such services, however, it is necessary to have some form of Internet access. A lack of involvement in digital society may produce new forms of social exclusion. Older adults are particularly at risk of Internet-related social exclusion, since they tend to use the Internet less than younger adults. Little is known, however, about whether this lower level of Internet use among older people is in fact accompanied by a sense of social exclusion. In order to investigate the subjective sense of digital social exclusion resulting from a lack of Internet usage, we conducted a secondary analysis of a representative, cross-sectional telephone survey of 1,037 adults aged 65 years and over and living in Switzerland. We found that 33% of "onliners" reported that they would feel socially excluded were they to stop using the Internet, compared with 14% of "onliners" who felt socially excluded on account of their lack of Internet use. Our analyses show that onliners' attitudes toward Internet use and the variety of online applications available were related to their sense of social exclusion. By contrast, offliners' attitudes toward Internet use and their feelings of loneliness in general were predictors for their sense of social exclusion as a result of not using the Internet. The results of the study as well as its implications for research and practice are discussed.

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TITLE PAGE

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Older Adults' Perceived Sense of Social Exclusion from the Digital World

Abstract

A great deal of information and many services can now be accessed digitally. In order to make use of such services, however, it is necessary to have some form of Internet access. A lack of involvement in digital society may produce new forms of social exclusion. Older adults are particularly at risk of Internet-related social exclusion, since they tend to use the Internet less than younger adults. Little is known, however, about whether this lower level of Internet use among older people is in fact accompanied by a sense of social exclusion. In order to investigate the subjective sense of digital social exclusion resulting from a lack of Internet usage, we conducted a secondary analysis of a representative, cross-sectional telephone survey of 1,037 adults aged 65 years and over and living in Switzerland. We found that 33% of "onliners" reported that they would feel socially excluded were they to stop using the Internet, compared with 15% of "offliners" who felt socially excluded on account of their lack of Internet use. Our analyses show that onliners' attitudes toward Internet use and the variety of online applications available were related to their sense of social exclusion. By contrast, offliners' attitudes toward Internet use and their feelings of loneliness in general were predictors for their sense of social exclusion as a result of not using the Internet. The results of the study as well as its implications for research and practice are discussed.

Keywords: social exclusion, Internet use, older adults, digitalization

Introduction

Technology is pervasive in all areas of our lives. In recent years, we have seen the digitalization of everyday life on the back of high levels of technical innovation and the diffusion of information and communication technology (Castells, 2010). Certain segments of the population (such as older adults) often lack direct or easy access to this new technology (Mitzner et al., 2018). As a result, older adults are at risk of feeling excluded from the digital world (Hunsaker & Hargittai, 2018; van Deursen & Helsper, 2015).

Internet Use among Older Adults

The Internet is one of the most important examples of modern digital technology. It has an all-encompassing and diverse effect on our day-to-day lives. Nevertheless, empirical studies have observed a digital gap between generations (see e.g. Chang, McAllister, & McCaslin, 2015; Hunsaker & Hargittai, 2018; Olson, O'Brien, Rogers, & Charness, 2010; Seifert, Doh & Wahl, 2017). Differences between generations remain, even though the trend is increasing internet use among older adults; for example, in the United States of America, 67% of 65-year-olds and older are online (Pew Research Center, 2017). A representative survey across Switzerland and 16 European Union countries, for example, showed that only 49% of people aged 50 and over used the Internet (König, Seifert & Doh, 2018). The study also indicated that Internet use among older adults is influenced by personal factors such as age, gender, education, and income. In addition, prior experience with technology, social salience (Internet use among the members of one's social network), and contextual factors such as country-specific wealth and communication technology infrastructure predicted older adults' Internet usage.

Feelings of Digital Exclusion

Today, an increasing amount of information and many services can only be accessed online. The objective structures that shape our everyday choices are therefore changing. In various media such as radio, newspapers, and television, we often come across the statement, "Please visit our website for more information." This implies that access to information requires access to the Internet; those without access to or familiarity with the Internet are therefore excluded from such information. Furthermore, a growing number of service providers such as banks, post offices, and transport companies offer certain services exclusively online, or charge an extra fee for offline services. Hill, Betts, and Gardner (2015) have noted a "cumulative, self-propelling spiral of isolation whereby the digitally rich continue to become included and the digitally poor continue to become isolated within a culture where more of society's business and culture is conducted through technology" (p. 418).

Our study goes beyond an examination of the factors that influence Internet-related digital inequality between older and younger generations, and focuses on the implications of the lack of Internet usage among older adults (Helsper, 2012). One such potential implication is a perceived sense of social exclusion from the digital world as a result of not using or no longer using digital technologies such as the Internet. Since individuals may refrain from using the Internet for a range of reasons, and may do so voluntarily or involuntarily, the objective fact of exclusion may not necessarily imply a subjective perception of deprivation and social exclusion (Selwyn, 2003). Studies on Internet use therefore need to be complemented by a consideration of the subjective sense of exclusion. On our understanding, a perceived sense of social exclusion from the digital world can be defined as an individual feeling of not belonging to a digitally dominated society on account of not using the Internet. This definition therefore does not focus

on the use or lack of use of digital technologies, but rather on the impact of this (lack of) usage on individuals' sense of social exclusion.

From a social–scientific perspective, exclusion is understood as a lack of inclusion in a social group, society, or subsystem (see e.g., Kronauer, 2010). The need for acceptance and inclusion is a fundamental human motivation (Baumeister & Leary, 1995). Baumeister and Leary (1995) argue that social rejection can have detrimental consequences for individuals, which include low self-esteem, isolation, and symptoms of depression. Helsper (2012), meanwhile, states that clear links exist between digital exclusion (online) and social exclusion (offline). While there is little doubt that social exclusion has an adverse effect on individuals' psychological and physical well-being, it is important not only to consider objective social exclusion, but also to investigate the subjective sense of exclusion, since this is a further consequence of objective exclusion and mediates the former's effects on well-being (Cotten, Anderson, & McCullough, 2013). In other words, taking into account the subjective component of an individual's exclusion is crucial insofar as objective access to the digital world alone may not be a sufficient criterion or predictor of social exclusion.

The present study therefore examines (1) the prevalence of a perceived sense of social exclusion from the digital world in a representative sample of older Swiss adults (aged 65+), and (2) the possible determining factors of this feeling.

Why Are Older Adults More Susceptible to Digital Social Exclusion?

Older adults are particularly affected by the risk of being socially excluded from our Internet-dominated society (Olsson, Samuelsson, & Viscovi, 2017) for five main reasons: First, from the perspective of environmental gerontology, new technologies may be considered to contribute to a stimulating environment for successful aging (Lawton, 1983; Rowe & Kahn,

1997; WHO, 2015). Nevertheless, since older people often lack experience, skills, and social support from and access to the Internet, they face numerous barriers to the effective use of these technologies, which may lead them to regard this environment as exclusionary rather than stimulating. Second, as mentioned above, a considerable number of older adults in Switzerland and other countries do not use digital technologies. Third, older, retired adults do not need to use new technologies as part of their jobs, which reduces their incentive to adopt these technologies. Fourth, alongside an individual's age, it is also important to consider his or her level of technological socialization (Sackmann & Winkler, 2013); the baby-boomer generation, for instance, has not grown up with digital technologies and therefore has not been socialized into using them. Finally, from a developmental perspective, people become more vulnerable as they grow older, especially in the "fourth" age (Laslett, 1994). They therefore have to make a greater effort to learn to use new technologies, and often have to overcome the barriers arising from having fewer cognitive, physical, financial, and social resources (see e.g., Czaja et al., 2006; Schulz et al., 2015).

The Present Study

While Internet use among older adults in general has become a major topic in gerontology (Hunsaker & Hargittai, 2018; Seifert & Schelling, 2018), the same is not true of research on older adults' perceived sense of social exclusion from the digital world. To our knowledge, no national or international studies have investigated this question with reference to Internet use among older adults. The present study therefore explores the perceived sense of social exclusion among Swiss Internet users and non-users over 65 years of age. In particular, we examine the prevalence of the sense of social exclusion from the digital world when not using or

no longer using the Internet. Our first research question is therefore whether there are any differences between the sense of social exclusion felt by Internet users and non-users (RQ1).

The study also aims to determine those factors that affect older adults' sense of social exclusion from the digital world (RQ2). In other words, we investigate whether people who do feel excluded differ from those who do not in terms of their affinity for technology, their attitudes toward the Internet, their Internet-based activities, Internet use among the members of their social network, and their general feeling of loneliness, while controlling for age, gender, and education.

On the basis of previous research on technology usage among older adults (Czaja et al., 2006; Schulz et al., 2015), we hypothesize that the likelihood of feeling socially excluded will be higher among users who show a greater affinity for technology (H1).

Another variable that is likely to be associated with a sense of social exclusion from the digital world is the individual's attitude toward Internet use. This attitude, along with a recognition and appreciation of the social benefits of the Internet (Joyce & Kirakowski, 2015) has been shown to be an important determinant of Internet use in general—especially where generations that have not grown up with the Internet are concerned (Otaibi, 2012). We therefore hypothesize that participants with a positive attitude toward the Internet will report a higher level of social exclusion than those with a more negative attitude (H2).

In addition, research shows that using the Internet in a variety of ways (such as writing e-mails and searching for information) can enhance users' sense of belonging—particularly where social uses are concerned (see e.g., Hofer & Aubert, 2013). As a result, it is likely that the more different uses an individual makes of the Internet, the more he or she will feel socially excluded if prevented from using it (H3).

Furthermore, the level of Internet use among the members of one's close social network (i.e. family and friends) can also have a positive impact on older adults' level of social networking (Hogeboom et al., 2010). Nevertheless, Internet use among an individual's family and friends may also pressure him or her into using the Internet too, which would then result in a more pronounced feeling of social exclusion should he or she stop using it (H4).

Finally, we assume that a person's general level of loneliness will be associated with social exclusion from the digital world. Recent research shows that lonely people can overcome their sense of isolation by using the Internet to connect with other people (e.g., Nowland et al., 2018). If such people are prevented from using digital technologies, however, their sense of social exclusion will likely increase (Cotten et al., 2013). We therefore hypothesize that those who feel loneliest in general are more likely to also have a sense of Internet-related social exclusion (H5).

Method

Sample and Data

In the present secondary analysis, we used data from a nationally representative sample of older Swiss adults (Seifert & Schelling, 2015). These data were collected in 2014, and include a total of 1,037 Swiss residents aged 65 years and over. The collection method was a computer-assisted telephone interview (CATI), supplemented by a paper-and-pencil survey of households with no telephone connection. A standardized questionnaire (see the Appendix to the main paper in Seifert & Schelling, 2015) was administered to a simple random sample of permanent residents of Switzerland aged ≥ 65 years. The sample was drawn from the representative telephone book database AZ-Direct. The study placed no restrictions on upper age, current Internet use, or type of housing. The youngest person in the sample was 65 years old and the

oldest was 100 (mean age: women, 74.6 years; men, 74.3 years); 47% of the interviewees were men.

Measures

Internet use was measured as use of the Internet in the past six months. *Onliners* were defined as those who had used the Internet, regardless of the frequency of their usage, whereas *offliners* were defined as those who did not use the Internet at the time or had never used the Internet at all. We checked for significant differences between on- and offliners with respect to age, sex, education, affinity for technology, level of Internet use in the respective social network, and sense of loneliness in general (as defined below). We found significant differences between onliners and offliners with respect to age (72.1 to 78.2 years of age, $t = -15.32$, $p < .001$), sex (56.1% to 33.8% men, $\chi^2 = 49.28$, $p < .001$), education (32.2% to 12.7% with tertiary education, $\chi^2 = 94.71$, $p < .001$), affinity for technology (48.3% to 17.5% with high affinity, $\chi^2 = 100.85$, $p < .001$) level of Internet use in interviewees' social networks (3.71 to 3.31 on a 1-5-point Likert scale, $t = 7.28$, $p < .001$), and feelings of loneliness in general (8.9% to 16.1% agreeing they "sometimes feel alone", $\chi^2 = 11.87$, $p = .001$). To control for multivariate effects, we conducted a binary logistic regression analysis ($n = 970$, $\chi^2 = 387.50$, $df = 7$, $p \leq .001$, Nagelkerke's $R^2 = .45$), which showed that a feeling of loneliness in general ($OR = .685$, $p = .132$) does not significantly distinguish offliners from onliners when controlled for age ($OR = .855$, $p < .000$); nevertheless, sex ($OR = 2.091$, $p < .000$), education ($OR = 5.124$, $p < .000$), affinity for technology ($OR = 4.121$, $p < .000$), and level of Internet use in individuals' social networks ($OR = 1.625$, $p < .000$) did differ significantly between onliners and offliners.

The dependent variable, *perceived sense of social exclusion*, was assessed as a binary response (1 = yes, 0 = no) to the following questions. Onliners were asked, "Would you

sometimes feel excluded from society if you could no longer use the Internet?" Offliners were asked, "Do you sometimes feel excluded from society because you do not use the Internet?" This approach allowed us to investigate the present sense of exclusion felt by offliners and the sense of exclusion onliners expected to feel should they stop using the Internet.

The following variables were included as control variables. The sociodemographic variables included in the statistical analyses were: *age* (continuous in years, range 65–100 (M = 74.5, SD = 6.9), *sex* (1= female, 0 = male), and *education* (1 = obligatory schooling, 2 = secondary school, 3 = tertiary education). *Affinity for technology* was measured by means of a self-report question ("I am very interested in new technical things") using a five-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*; M = 3.0, SD = 1.3). A binary variable (1–3 = *low affinity* and 4–5 = *high affinity*) was then calculated on the basis of this variable. To measure *attitude toward the Internet*, we used Seifert & Schelling's (2015) 10-item general attitudes scale —which includes items such as "The Internet saves a lot of legwork" and "The Internet is stimulating and fascinating"—and calculated a new variable whereby 1 = *negative*, 2 = *ambivalent*, and 3 = *positive* attitudes toward the Internet. To measure the variety of ways in which participants used the Internet, we calculated an *Internet application usage score,* which incorporated 16 typical Internet applications such as e-mail, online shopping, and banking (M = 5.6, SD = 4.1). We asked onliners if they used these applications regularly (yes/no) and offliners whether they considered certain applications to be useful (yes/no). On the basis of this information, we then calculated a binary variable (0–7 applications = *low*, 8–16 applications = *high*). To control for the *level of Internet use in participants' social networks* we asked, "How would you rank the frequency of the following people's Internet use?" using a Likert-type scale (1 = *never*, 5 = *very frequent*). On the basis of their answers concerning partners, family

members, and friends, we calculated the overall mean as a new variable (M = 3.5, SD = 0.8). To control for *feelings of loneliness in general* (regardless of Internet use) we used a self-report item ("Sometimes I feel alone") measured on a five-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*; M = 1.8, SD = 1.2). On the basis of this variable, we then calculated a binary variable (1–3 = *not at all or sometimes feel slightly alone* and 4–5 = *sometimes feel alone*).

Statistical Analyses

We employed SPSS version 24 (IBM Statistics, Armonk, NY, USA) for the statistical analyses and used univariate analyses to describe differences between the characteristics of the onliner and offliner groups by applying Student's t-tests and chi-square tests. Additionally, we conducted one binary logistic regression for each group to analyze the predictors of the perceived sense of social exclusion.

Results

Descriptive Data on the Perceived Sense of Social Exclusion

In our sample, 626 (60.4%) of the participants were onliners and 411 (39.6%) were offliners; 32.7% of the onliners answered yes to the question "Would you sometimes feel excluded from society if you could no longer use the Internet?" and 14.1% of the offliners answered yes to the question "Do you sometimes feel excluded from society because you do not use the Internet?" Significantly, there were more onliners (χ^2 = 43.78, p < .001) who said they would feel excluded if they could not use the Internet than offliners who said they felt excluded by not using the Internet.

Offliners who felt excluded were significantly more often female, people with positive attitudes toward the Internet and a strong interest in different online applications, and those who felt more alone in general (see Table 1). Age, education, affinity for technology, and Internet use

in the participants' social network did not differ significantly between those who felt excluded and those who did not.

Onliners who would feel a sense of social exclusion form the digital world should they no longer be able to use the Internet were significantly more often those with a tertiary education, a high affinity for technology, positive attitudes toward the Internet, and those who used many online applications and had a social network consisting of Internet users (see Table 1). Age, sex, and feelings of loneliness did not significantly differ between those who felt excluded and those who did not.

Multivariate Results

Table 2 shows the results of two binary logistic regressions. In both models, perceived sense of social exclusion from the digital world (1 = yes, 0 = no) served as the dependent variable, while age, gender, education, affinity for technology, attitudes toward the Internet, Internet application usage scores, mean Internet usage in participants' social networks, and feelings of loneliness were included as explanatory variables. The models were statistically significant, which indicates that, as a set, the predictors reliably distinguished between those who felt excluded from the digital world and those who did not.

We ran two different models (Model 1 and Model 2). Only onliners were included in Model 1, which showed that their attitudes toward the Internet and their Internet application usage scores contributed significantly to explaining the dependent variable; age, gender, education, affinity for technology, Internet use among participants' social networks, and feelings of loneliness were not significant predictors in the multivariate analysis. People with more positive attitudes toward the Internet and those who used a wide variety of online applications were more often among those who would feel excluded if they discontinued their Internet use

than those who had more negative attitudes toward the Internet and did not use a range of online applications.

Only offliners were included in Model 2. This model showed that attitudes toward the Internet and feelings of loneliness contributed significantly to the model's explanatory power; age, gender, education, affinity for technology, Internet application usage score, and Internet use in participants' social networks were not significant predictors in the multivariate analysis. People who had positive attitudes toward the Internet and those who felt lonely in general were more likely to be in the group of people who felt socially excluded than those who had negative attitudes toward the Internet and who did not feel lonely in general.

Discussion

The present study examined the prevalence and determinants of Internet-related perceived social exclusion from the digital society among older adults. Our first research question (RQ1) aimed to ascertain the number of older Internet users and non-users who felt excluded from the digital world. We found that there was a greater proportion of onliners (32.7%) who would feel such an exclusion should they have to discontinue their Internet use than offliners (14.1%) who felt excluded due to their lack of Internet usage. This indicates that offliners potentially do not see Internet-based participation in the digital world as necessary and therefore do not feel socially excluded as a result of their non-participation. As Selwyn (2013) has noted, we should not consider the use of Information and Communication Technologies (ICT) such as the Internet as normal and non-use as abnormal. Many older adults have their own reasons for choosing not to use the Internet (Czaja et al., 2006; Nimrod, 2018; Seifert & Schelling, 2018). Nevertheless, technological diffusion is an ongoing process and, as stated above, the current dominance of online-only information and services will only intensify in future (Hill, Betts, & Gardner, 2015).

Not using the Internet therefore means not being able to access certain information or use certain services, which may affect people's offline daily lives and thus exacerbate their sense of exclusion from the digital society.

Our second research question (RQ2) addressed the predictors of onliners' and offliners' feelings of social exclusion. We hypothesized that an affinity for technology would be positively associated with a sense of social exclusion from the digital world (H1). This association, however, was neither observed for onliners nor for offliners. One possible explanation for this finding could be that participants did not regard the Internet as a "new technical entity," such as a smartphone or smartwatch, but rather as a mass medium that did not demand any special affinity for technology (Morris & Ogan, 1996; Rogers, 2010).

Our second hypothesis (H2) predicted a positive association between attitudes toward the Internet and Internet-related social exclusion. Our data supported this hypothesis for both onliners and offliners. More precisely, the more positively they regarded the Internet, the more participants would feel socially excluded if they could not use it. This finding makes sense in light of the potential social benefits that come with Internet use (Joyce & Kirakowski, 2015).

Internet application usage was only seen to have an effect on social exclusion among onliners (H3). This could be due to the fact that offliners do not use the Internet and therefore cannot imagine the advantages of the various applications in more concrete terms. This could then lead to generally lower levels of this variable and therefore lower levels of variance that can be shared with social exclusion.

With respect to our fourth hypothesis concerning the effect of the Internet use in a person's social network on social exclusion (H4), the data collected do not support the hypothesis. Where perceived social exclusion is concerned, it does not seem to matter whether

the individuals in a person's social network use the Internet or not. In other words, it may or may not be more likely that a person will feel more socially excluded the more his or her family and friends use the Internet. This may be due to the fact that a high level of Internet use in a person's social network may increase the pressure on him or her to use the Internet. However, it may also reduce this pressure because an older person may simply rely on others to handle Internet-related matters. Further research should investigate this association in more detail.

With regard to our fifth and final hypothesis concerning the effect of a person's sense of loneliness in general on his or her social exclusion from the digital world (H5), an effect was found here only among offliners. Offliners who felt lonely in general were more likely to be in the group of people who felt socially excluded than those who did not feel lonely in general. It is possible that onliners who feel lonely in general draw a clearer distinction between the online and the offline world.

As a whole, the findings of this study indicate a moderate sense of social exclusion from the digital world among both groups. Onliners appeared to be more affected by a potential stop of their Internet use, since they were more dependent on the Internet and/or saw the benefits of Internet use (such as social participation) in their everyday lives. The results also indicate that a form of social pressure exists among the older population with regard to Internet use. As more and more service providers begin to offer certain information and services on an online-only basis (or charge an extra fee for offline services), older citizens who are offline will "become increasingly disadvantaged from a socio-ecological point of view, as the Internet's societal pervasiveness progresses" (Peacock & Künemund, 2007, p. 191).

This distinction between those who have access to the Internet and those who do not adds a fundamental divide to the existing sources of social inequality and social exclusion (Hunsaker

& Hargittai, 2018). Despite the generally diminishing digital gap between younger and older age groups, it has been claimed that a lack of Internet or new technology use among older people perpetuates a form of digital inequality (Hargittai, Piper, & Morris, 2018). Further research over a longer time period is required to investigate how a sense of social exclusion from the digital world changes or reshapes this digital inequality.

Gerontologists can address the risks of social exclusion in three ways: (1) by working with people who feel excluded and exploring why they feel that way; (2) by empowering older people through individual training programs on new technologies – which may, for example, highlight the advantages of Internet use and thus indirectly affect their attitudes toward the Internet; and (3) by sensitizing policymakers and older adults' relatives to this topic. This should ensure that communities, authorities, companies, and service providers become more aware of and sensitive toward the issue of Internet exclusion, particularly if they plan to offer their services on an online-only basis in future. Such measures would help to kick-start sociopolitical discussions on other potential interventions and frameworks to reduce the risk of social exclusion.

Inclusion in the digital world does not stop at Internet access. Therefore, media competence training (i.e., practices that allow people to access and critically evaluate content) is also needed. A gerontological training approach including such a curriculum is the German national project "Senioren-Technik-Botschafter" ("senior technology experts"), which was scientifically evaluated by Doh, Schmidt, Herbolsheimer, Jokisch, and Wahl (2015). In this project, technically experienced older adults were educated as knowledge mediators in their neighborhood on behalf of technically inexperienced older adults concerning education and Internet use. In the project, 300 senior technology experts were pedagogically qualified, and

1,500 technically unfamiliar older adults were trained to use the Internet and other technologies. Doh et al. (2015) found the following factors relevant for good learning: a) learning settings that are individualized and respect individual competence and learning speeds; b) small groups with direct contact between teachers and students (on an eye-to-eye basis); c) sufficient time for exercises and repetitions; d) paper and digital handouts for home training; e) formal education settings supplemented by informal support settings (a regulars' table, informal meetings, and home visits); f) mobile devices offering easier entry than computers and complex operation systems; and g) age similarity between teacher and learner.

Limitations

The following limitations of this study have been identified: First, since the data were collected in Switzerland, they have a limited regional focus and only cover a short period of time. Since further increases in Internet use among older people across the world can be expected in future, levels of perceived social exclusion may differ from country to country and change over time.

Second, the dependent variable—*perceived sense of social exclusion*—was only measured with one item, despite the fact that the literature on social exclusion considers such an evaluation to be a more nuanced matter (e.g., Kronauer, 2010). One-item measures are problematic, since they do not allow us to distinguish between naturally occurring variance and measurement error. Nevertheless, the variables used in this study enabled us to carry out an initial study on older people's sense of social exclusion from the digital world. Future studies should operationalize this concept with more multidimensional items.

Third, the data did not contain other potentially important factors for Internet use, such as personal histories of technology usage, participants' objective health levels, daily media and

communication use, ability to cope with day-to-day activities, and psychological factors such as well-being or personality.

Conclusion

Some of the older onliners and offliners interviewed in this study stated that they felt socially excluded from the Internet-dominated world. Onliners more frequently reported such a sense of social exclusion than offliners. This implies that a sense of social exclusion depends on a certain appreciation of the benefits of the Internet. Nevertheless, our data also showed that a small proportion of today's older offliners felt socially excluded because of their lack of Internet use. Gerontological social workers and policymakers must therefore work together to minimize the risk of social exclusion in relation to new technology use, especially among the older population.

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TABLES

Older Adults' Perceived Sense of Social Exclusion from the Digital World

Table 1
Characteristics of onliners and offliners with respect to their perceived sense of social exclusion

	Perceived sense of social exclusion					
	Onliners		*Significance*	***Offliners***		*Significance*
	Feeling of exclusion (n = 55)	No feeling of exclusion (n = 336)		Feeling of exclusion (n = 200)	No feeling of exclusion (n = 747)	
Mean age (in years)	71.9	72.1	t (609) = -.38, p =.698	77.1	78.1	t (389) = -.98, p =.326
% female	42.5	44.5	χ^2 (1, n = 611) =.22, p =.636	78.2	64.0	χ^2 (1, n = 391) = 4.24, ***p* =.039**
% tertiary education	38.0	29.2	χ^2 (1, n = 611) = 4.78, ***p* =.029**	14.5	12.8	χ^2 (1, n = 391) =.12, p =.721
% high affinity for technology	54.5	45.1	χ^2 (1, n = 610) = 4.73, ***p* =.030**	23.6	16.9	χ^2 (1, n = 387) = 1.47, p =.224
% positive attitudes toward the Internet	64.8	40.6	χ^2 (1, n = 610) = 46.86**, *p* <.001**	31.5	15.1	χ^2 (1, n = 385) = 13.95**, *p* =.001**
% high Internet application usage score	67.0	43.8	χ^2 (1, n = 611) = 28.99, ***p* <.001**	23.6	11.0	χ^2 (1, n = 391) = 6.75, ***p* =.009**
Mean Internet use in social network (scale 1 “no use” to 5 “very high”)	3.8	3.6	t (600) = 3.36, ***p* =.001**	3.4	3.2	t (378) = 1.23, p =.216
% feeling lonely	9.1	7.7	χ^2 (1, n = 602) =.35, p =.550	30.9	12.7	χ^2 (1, n = 385) = 12.01, ***p* =.001**

Note: **bold text** indicates statistical significance

Table 2
Logistic regression analysis for the predictors of the perceived sense of social exclusion

	Onliners				***Offliners***			
Predictor	*b* (*SE*)	*OR*	*95% CI*	*p*-value	*b* (*SE*)	*OR*	*95% CI*	*p*-value
Constant	-4.60 (1.59)				-1.97 (1.94)			
Age	.01 (.02)	1.01	[.97, 1.04]	.587	-.02 (.02)	.97	[.93, 1.02]	.350
Gender: female (ref. male)	.21 (.20)	1.24	[.83, 1.85]	.288	.64 (.39)	1.91	[.88, 4.12]	.099
Education: secondary (ref. obligatory)	.43 (.38)	1.54	[.72, 3.30]	.263	.23 (.36)	1.26	[.62, 2.56]	.526
Education: tertiary (ref. obligatory)	.79 (.40)	2.20	[.99, 4.89]	.060	.64 (.52)	1.89	[.67, 5.33]	.225
Affinity for technology: high (ref. low)	-.07 (.20)	.93	[.62, 1.39]	.737	.31 (.40)	1.36	[.61, 3.02]	.445
Attitudes toward the Internet: ambivalent (ref. negative)	1.45 (.40)	4.26	[1.92, 9.45]	**<.001**	1.03 (.41)	2.81	[1.26, 6.26]	**.011**
Attitudes toward the Internet: positive (ref. negative)	1.84 (.40)	6.29	[2.84, 13.93]	**<.001**	1.43 (.48)	4.17	[1.63, 10.67]	**.003**
Internet application usage score: high (ref. low)	.63 (.21)	1.88	[1.24, 2.84]	**.003**	.39 (.41)	1.48	[.66, 3.32]	.336
Mean Internet use in social network	.18 (.13)	1.20	[.93, 1.55]	.145	-.01 (.17)	.99	[.70, 1.41]	.978
Feeling lonely (ref. no)	.02 (.34)	1.02	[.52, 2.01]	.937	1.09 (.37)	2.97	[1.42, 6.18]	**.004**
Model χ^2	68.16 [10], p <.001				27.81 [10], p =.002			
Cox and Snell R^2/Nagelkerke R^2	.11/.15				.07/.13			
N	585				363			

Note: **bold text** indicates statistical significance; *b*, logits; *SE*, standard errors; *OR*, odds ratios; 95% CI, 95% confidence interval for odds ratios. Missing data were excluded